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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/039,072

01/02/2002

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ITL.0613US

9193

7590

01/26/2006

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EXAMINER

WARE, CICELY Q

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/039,072	Applicant(s) YELLIN ET AL.	
	Examiner Cicely Ware	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6, 7, 17-20 and 28-30 is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-16 and 21-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see **REMARKS**, filed 11/10/2005 with respect to the rejection(s) of claim(s) 1 under 35 USC 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Cao et al. (US Patent 6,463,099).

Specification

2. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

3. Claims 6 and 28 are objected to because of the following informalities:
- a. Claim 6, lines 13-14, examiner suggests applicant re-write these lines for clarification purposes.
 - b. Claim 28, lines 2-3, examiner suggests applicant re-write these lines for clarification purposes.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 4, 5, 8-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 4, recites "substantially same". "Substantially same" is vague and indefinite because it fails to specify a definite limitation.

b. Claim 8, recites "substantially equal". Substantially equal is vague and indefinite because it fails to specify a definite limitation.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 3, 11, 12-16, 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al. (US Patent Application 2002/0141437) in view of Cao et al. (US Patent 6,463,099).

(1) With regard to claim 1, Meyer et al. discloses a method comprising: receiving

over a channel a signal including a desired portion associated with a desired channel and an undesired portion mixed with said desired portion (Pg. 3, col. 1, lines 17-20); and recovering the desired portion from the signal by adaptively equalizing the channel based on at least one of prior knowledge and empirical estimation of the desired channel (Pg. 4, col. 2, lines 7-13, 28-39, Pg. 5, col. 1, lines 23-28, col. 2, lines 26-30, 43-63).

However Meyer et al. does not disclose adaptively equalizing the channel based on empirical estimation of the received signal auto-covariance and empirical estimation of the desired channel.

However Cao et al. discloses adaptively equalizing the channel based on empirical estimation of the received signal auto-covariance and empirical estimation of the desired channel (col. 1, lines 14-20, 62-67, col. 2, lines 20-62).

Therefore it would have been obvious to one of ordinary skill in the art to modify Meyer et al. in view of Cao et al. to incorporate adaptively equalizing the channel based on empirical estimation of the received signal auto-covariance and empirical estimation of the desired channel in order to provide second order channel statistics (Cao et al., col. 2, lines 54-56).

(2) With regard to claim 2, claim 2 inherits all the limitations of claim 1. Meyer et al. further discloses receiving the desired portion of the signal including desired channel portions of said channel from a desired source, receiving a priori information related to the desired portion over said channel to derive said prior knowledge (Pg. 4, col. 2, lines

1-46); receiving the undesired portion of the signal in a distorted form including an interference from one or more interfering sources (Pg. 3, col. 1, lines 17-20).

(3) With regard to claim 3, claim 3 inherits all the limitations of claim 2. Meyer et al. further discloses in (Figs. 6 and 8) using an array of at least two spatially separated antennas to receive the signal into at least two propagating signal portions through at least two propagation paths (Pg. 3, col. 2, lines 40-56, 68-70, Pg. 5, col. 1, lines 51-55).

(4) With regard to claim 11, see rejection of claim 1. Meyer et al. further discloses a processor (Pg. 1, col. 1, line 62 – col. 2, lines 1-13, Pg. 2, col. 2, lines 25-45, Pg. 4, col. 2, lines 7-40).

(5) With regard to claim 12, claim 12 inherits all the limitations of claim 11. Meyer et al. further discloses wherein said communication interface includes at least two antennas (Pg. 1, col. 1, lines 5-11, col. 2, lines 1-13, Pg. 3, col. 2, lines 68-70).

(6) With regard to claim 13, claim 13 inherits all the limitations of claim 11. Meyer et al. further discloses the device is a MODEM (Pg. 1, col. 1, lines 5-33, 54-65).

(7) With regard to claim 14, claim 14 inherits all the limitations of claim 13. Meyer et al. further discloses wherein the MODEM includes an equalizer capable of detecting said signal in the presence of at least one of co-channel and inter-symbol interferences (Pg. 1, col. 1, lines 54-65).

(8) With regard to claim 15, claim 15 inherits all the limitations of claim 14. Meyer et al. further discloses wherein the MODEM is adapted to operate in a cellular environment with time division multiple access to enable digital transmission of the signal allowing a number of users to access a single radio frequency channel without

interference by allocating unique time slots to each user within each channel (Pg. 1, col. 1, lines 5-24).

(9) With regard to claim 16, claim 16 inherits all the limitations of claim 11. Meyer et al. further discloses wherein said device is an adaptive equalizer providing a blind adaptive space-time equalization on said signal based on minimum mean square error that reduces an interference in a asynchronous time division multiple access cellular system (Pg. 1, col. 1, lines 5-24, Pg. 2, lines 54-64, col. 2, lines 25-44, Pg. 4, col. 1, lines 52-60-col. 2, lines 1-47).

(10) With regard to claim 21, see rejection of claims 1 and 11. Meyer et al. further discloses a cellular phone and a MODEM (Pg. 1, lines 5-11, 27-31).

Meyer et al. does not explicitly disclose a cellular phone and a MODEM. However it is well known in the art that a cellular phone is a digital mobile communication system and a MODEM comprises both receive and transmitter capabilities.

(11) With regard to claim 22, claim 22 inherits all the limitations of claim 21. Meyer et al. further discloses including an adaptive equalizer to provide a blind adaptive space-time equalization on said signal based on minimum mean square error (Pg. 4, col. 2, lines 1-47, Pg. 5, col. 1, lines 55-62 – col. 2, line 1).

(12) With regard to claim 23, claim 23 inherits all the limitations of claim 22. Meyer et al. further discloses the cellular phone is adapted to operate on the signal in a cellular environment with time division multiple access to enable a general packet radio

service over a network for global system for mobile communication (Pg. 1, col. 1, lines 5-24).

(13) With regard to claim 24, see rejection of claims 1, 11, 21. Meyer et al. further discloses a mobile device (Pg. 1, col. 1, lines 5-24).

(14) With regard to claim 25, claim 25 inherits all the limitations of claim 24. See rejection of claim 22.

(15) With regard to claim 26, claim 26 inherits all the limitations of claim 24. See rejection of claim 23.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al. (US Patent Application 2002/0141437) in view of Cao et al. (US Patent 6,463,099) as applied to claim 3, in view of Raleigh et al. (US Patent 6,452,981).

With regard to claim 4, claim 4 inherits all the limitations of claim 3. However Meyer et al. does not disclose estimating a space-time-cross-covariance matrix of the received signal and the desired channel from said at least two propagating signal

portions and said a priori information related to the desired portion over a signal burst; and deriving one or more equalizer coefficients that are based on averaging of the received signal over a time window that is the same as the signal burst.

However Raleigh et al. discloses estimating a space-time-cross-covariance matrix of the received signal and the desired channel from said at least two propagating signal portions and said a priori information related to the desired portion over a signal burst; and deriving one or more equalizer coefficients that are based on averaging of the received signal over a time window that is the same as the signal burst (abstract, col. 1, lines 17-43, col. 4, lines 41-48, 60-67, col. 6, lines 6-18, col. 10, lines 30-35, 44-50, col. 18, lines 21-32, col. 21, lines 57-64, col. 30, lines 19-40, col. 36, lines 6-27).

Therefore it would have been obvious to one of ordinary skill in the art to modify Meyer et al. in combination with Cao et al. in view of Raleigh et al. to incorporate estimating a space-time-cross-covariance matrix of the received signal and the desired channel from said at least two propagating signal portions and said a priori information related to the desired portion over a signal burst; and deriving one or more equalizer coefficients that are based on averaging of the received signal over a time window that is the same as the signal burst in order to characterize a collection of average channel directions and the associated average strength for each direction (Raleigh et al., col. 4, lines 44-48).

10. Claims 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al. (US Patent Application 2002/0141437) in view of Cao et al. (US Patent

6463099), as applied to claim 1, in further view of Langberg et al. (U.S. Patent No. 5, 852, 630).

With regard to claim 27, claim 27 inherits all the limitations of claim 1. Meyer et al. combination with Cao et al. disclose all of the subject matter as described in the previous rejection (see rejection of claim 1), except for the method written as a computer program product with a computer readable storage medium.

However, Langberg et al. teaches that the method and apparatus for a transceiver warm start activation procedure with precoding can be implemented in software stored in a computer-readable medium. The computer readable medium is an electronic, magnetic, optical, or other physical device or means that can contain or store a computer program for use by or in connection with a computer-related system or method (note column 3, lines 51-65). One skilled in the art at the time the invention was made would have clearly recognized that the method of Meyer et al. would have been implemented into software. The implemented software would perform the same function of the hardware for less expense, greater adaptability, and greater flexibility. Therefore, it would have been obvious to have, used the software in Meyer et al. as taught by Langberg et al. in order to reduce cost and improve the adaptability and flexibility of the communication system.

Allowable Subject Matter

11. Claims 5, 6, 7, 8-10, 17-20, 28-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all

of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: The instant application discloses a method for receiving over a channel a signal including a desired portion associated with a desired channel and an undesired portion mixed with the desired portion. Prior art references show similar methods but fail to teach: **“averaging the temporal transition of the interference patterns across the at least two propagating signal portions to derive the desired portion from the received signal; operating on the channel using the at least two propagation paths to compute a measure indicative of an average behavior of the channel”**, as in claims 6, 17; **“providing an adaptive equalization by periodically repeating the empirical estimation of the desired channel and the received signal auto-covariance”**, as in claims 7, 28; **“averaging the received signal over at least two equal signal portions of the signal in parallel over a first and second propagation paths”**, as in claim 8; **“adaptively adjusting equalization parameters of the channel based on a plurality of first samples of the received signal collected in said first propagation path and a plurality of second samples of the received signal collected in said second propagation path”**, as in claim 9; **“operating on the channel in a dual reception mode in order to extract the undesired portion to increase gain of the signal”**, as in claim 10; **“use an array of at least two spatially separated antennas to receive the signal into at least two propagating signal portions through at least two propagation paths”**, as in claims 18, 29; **“derive one or more equalizer coefficients that are based on averaging of the received signal over one signal burst”**, as in

claim 19; **“apply a threshold decision criterion to the common output to recover the desired portion from the received signal”**, as in claims 5, 20, 30;

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 571-272-3047. The examiner can normally be reached on Monday – Friday, 8-5.

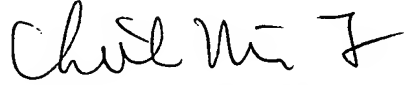
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Art Unit: 2634

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Cicely Ware

cqw
January 23, 2006


CHIEH M. FAN
SUPERVISORY PATENT EXAMINER